Claims

1. A method for growing stem cells comprising the steps of
   - providing stem cells with supporters said supporters being genetically modified in order to provide externally regulatable interactions between the supporters and the stem cells;
   - applying an external signal for starting or stopping the interactions.

2. The method of claim 1 wherein the interactions are based on secretion or display of substances.

3. The method of claim 1 wherein the supporters are modified for the secretion or display of substances under control of a promoter.

4. The method of claim 1 wherein the external signal is the addition or removal of substances, heat, light, sound, odor, taste, touch (mechanics), and/or electromagnetic waves.

5. The method of claim 1, wherein the supporters are non-stem cells.

6. The method of claim 1, wherein the supporters are stem cells.

7. The method of claim 1, wherein the supporters and stem cells are interchangeable upon genetic modification and interaction.

8. The method of claim 1, wherein the supporters are forming a micro-environment.

9. The method of claim 1, wherein the supporters are keratinocytic stem cells, lung and tracheal epithelial cells, bone marrow and hepatic stroma cells, neural-glial precursor cells, tissue cells or "spore"-like stem cells.

10. The method of claim 1, wherein the supporters are secreting or displaying cell based growth factors, protein growth factors and/or interleukines.

11. The method of claim 1, wherein the supporters are transformed by a vector comprising a gene for interleukines, protooncogenes, oncogenes, cell cycle control genes, signal transduction genes, and/or cell based growth factors as well as a regulatable expression system, such as a tetracycline regulatable expression system.

12. A vector for the use in a method according to claim 1 selected from the group consisting of pRetro-tet-off-E6/E7, pRetro-tet-off (tTA deleted) E6/E7, pRetro-tet-off-U19-tsA58, pRetro-tet-off-SV40Tag, pRetro-tet-off-T2, pRetro-tet-off-BCL2, pUHD15.1-ß-gal-NeoR, pUHD10.3-TGFß3, pUHD10.3-hIL3, pUHD10.3-hIL6, pUHD10.3-hflt3-ligand exon 6, pUHD10.3-hNGF, pUHD10.3-hCNTF, pUHD10.3-hGDNF, pUHD10.3-hIL2, pUHD10.3-hIL7, pUHD10.3-hIL4, pUHD10.3-hGMCSF, pD12YCVJC-long-CNTF, pD12YCVJC-long-GDNF, pD12YCVJC-short-CNTF and pD12YCVJC-short-GDNF, as well as pRetro-tet-on-derivates (including pRetro-tet-on-ART derivatives), other pRetro-tet-off-derivatives (including pLP-TRE2 and pLP-RevTRE derivatives), adenoviral-derivatives, and lenti-viral derivatives.

13. A supporter cell for the use in a method to claim 1 being genetically modified in order to provide a regulatable secretion and/or a display of substances of the supporters.

14. A supporter cell for the use in a method to claim 1 being genetically modified, mutated, and/or modification using molecular and cellular bred in order to change tet-on to tet-off and vice versa, change oncogenicity(such as SV40Tag to E6/E7), trans-lineage-commitement (such as brain to skin), and trans-species specificity (such as mouse to human).

15. A method of curing diseases by gene therapy and/or cell therapy in combination with tissue engineering when the functional expression of stem cells is helped with the engineered architecture of the tissue which diseases are related to insufficient and/or lack and/or disorders of stem cells, by administering to patients in need thereof, supporters being genetically modified in order to provide externally regulatable interaction between supporter cells and stem cells.

16. Cell lines obtainable by transforming cells with the vector(s) according to claim11.

17. Use of cell lines according to claim 16 for the scale up productions of stem/supporter cell derivatives, such as surfactant, neurotropic factors, myeline, for therapeutical and industrial applications.